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The Fourth Industrial Revolution

What It Means, How To Respond

"Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000," says Accenture Chairman and CEO, Pierre Nanterme. With the dawn of the Fourth Industrial Revolution, the question is - How many more will disappear by 2025? Chances are, many more will. Here's an excerpt of the article by Klaus Schwab, founder and Executive Chairman of the World Economic Forum, published in the weforum.org

We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society.

The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

CII

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Purpose: To excite Indian businesses, SMEs, executives and students about the immense business opportunity in not only adopting Sustainability as Strategy in their companies but also inspire them to the possibilities of a big market for innovative sustainability products and services.

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Information in this publication is drawn from a variety of sources, including published reports, interviews with practicing managers, academia and consultants. While doing so utmost importance is given to authenticity.

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IN SHORT

- **The Fourth Industrial Revolution is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres**
- **It is evolving at an exponential rather than a linear pace**
- **It is disrupting almost every industry in every country**
- **It heralds the transformation of entire systems of production, management, and governance**
- **This revolution will raise income levels across the board yet it could yield greater inequality resulting in higher social tensions**
- **Talent, more than capital, will represent the critical factor of production**
- **A winner-takes-all economy offers only limited access to the middle class. It could be a recipe for democratic malaise and dereliction**
- **A key trend is the development of technology-enabled platforms that combine both demand and supply to disrupt existing industry structures**
- **Governments will increasingly face pressure to change their current approach to public engagement and policymaking**
- **The inexorable integration of technology in our lives could diminish some of our quintessential human capacities, such as compassion and cooperation**

There are three reasons why today's transformations represent not merely a prolongation of the Third Industrial Revolution but rather the arrival of a Fourth and distinct one: velocity, scope, and systems impact. The speed of current breakthroughs has no historical precedent. When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these changes herald the transformation of entire systems of production, management, and governance.

The possibilities of billions of people connected by mobile devices, with unprecedented

processing power, storage capacity, and access to knowledge, are unlimited. And these possibilities will be multiplied by emerging technology breakthroughs in fields such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing.

Navigating the next industrial revolution

Revolution	Year	Information
1	1784	Steam, Water, Mechanical production equipment
2	1870	Division of labour, Electricity, Mass production
3	1969	Electronics, IT, Automated production
4	?	Cyber-physical systems

Challenges and opportunities

Like the revolutions that preceded it, the Fourth Industrial Revolution has the potential to raise global income levels and improve the quality of life for populations around the world. To date, those who have gained the most from it have been consumers able to afford and access the digital world; technology has made possible new products and services that increase the efficiency and pleasure of our personal lives. Ordering a cab, booking a flight, buying a product, making a payment, listening to music, watching a film, or playing a game—any of these can now be done remotely.

In the future, technological innovation will also lead to a supply-side miracle, with long-term gains in efficiency and productivity. Transportation and communication costs will drop, logistics and global supply chains will become more effective, and the cost of trade will diminish, all of which will open new markets and drive economic growth.

At the same time, as the economists Erik Brynjolfsson and Andrew McAfee have pointed out, the revolution could yield greater inequality, particularly in its potential to disrupt labor markets. As automation substitutes for labor across the entire economy, the net displacement of workers by machines might exacerbate the gap between returns to capital and returns to labor. On the other hand, it is also possible that the displacement of workers by technology will, in aggregate, result in a net increase in safe and rewarding jobs.

We cannot foresee at this point which scenario is likely to emerge, and history suggests that the outcome is likely to be some combination of the two. However, I am convinced of one thing—that in the future, talent, more than capital, will represent the critical factor of production. This will give rise to a job market increasingly segregated into “low-skill/low-pay” and “high-skill/high-pay” segments, which in turn will lead to an increase in social tensions.

This helps explain why so many workers are disillusioned and fearful that their own real incomes and those of their children will continue to stagnate. It also helps explain why middle classes around the world are increasingly experiencing a pervasive sense of dissatisfaction and unfairness. A winner-takes-all economy that offers only limited access to the middle class is a recipe for democratic malaise and dereliction.

The impact on business

An underlying theme in my conversations with global CEOs and senior business executives is that the acceleration of innovation and the **velocity of disruption are hard to comprehend or anticipate and that these drivers constitute a source of constant surprise, even for the best connected and most well informed.** Indeed,

across all industries, there is clear evidence that the technologies that underpin the Fourth Industrial Revolution are having a major impact on businesses.

On the supply side, many industries are seeing the introduction of new technologies that create entirely new ways of serving existing needs and significantly disrupt existing industry value chains. Disruption is also flowing from agile, innovative competitors who, thanks to access to global digital platforms for research, development, marketing, sales, and distribution, can oust well-established incumbents faster than ever by improving the quality, speed, or price at which value is delivered.

Major shifts on the demand side are also occurring, as growing transparency, consumer engagement, and new patterns of consumer behavior (increasingly built upon access to mobile networks and data) force companies to adapt the way they design, market, and deliver products and services.

A key trend is the development of technology-enabled platforms that combine both demand and supply to disrupt existing industry structures, such as those we see within the "sharing" or "on demand" economy. These technology platforms, rendered easy to use by the smartphone, convene people, assets, and data—thus creating entirely new ways of consuming goods and services in the process. In addition, they lower the barriers for businesses and individuals to create wealth, altering the personal and professional environments of workers. These new platform businesses are rapidly multiplying into many new services, ranging from laundry to shopping, from chores to parking, from massages to travel.

On the whole, there are four main effects that the Fourth Industrial Revolution has on business—on customer expectations, on product enhancement, on collaborative innovation, and on organizational forms. Whether consumers or businesses, customers are increasingly at the epicenter of the economy, which is all about improving how customers are served.

The impact on government

As the physical, digital, and biological worlds continue to converge, new technologies and platforms will increasingly enable citizens to engage with governments, voice their opinions, coordinate their efforts, and even circumvent the supervision of public authorities. Simultaneously, governments will gain new technological powers to increase their control over populations, based on pervasive surveillance systems and the ability to control digital infrastructure. On the whole, however, governments will increasingly face pressure to change their current approach to public engagement and policymaking, as their central role of conducting policy diminishes owing to new sources of competition and the redistribution and decentralization of power that new technologies make possible.

Ultimately, **the ability of government systems and public authorities to adapt will determine their survival.** If they prove capable of embracing a world of disruptive change, subjecting their structures to the levels of transparency and efficiency that will enable them to maintain their competitive edge, they will endure. If they cannot evolve, they will face increasing trouble.

This will be particularly true in the realm of regulation. Current systems of public policy and decision-making evolved alongside the Second Industrial Revolution, when decision-makers had time to study a specific issue and develop the necessary response or appropriate regulatory framework. The whole process was designed to be linear and mechanistic, following a strict "top down" approach.

But such an approach is no longer feasible. Given the Fourth

Industrial Revolution's rapid pace of change and broad impacts, legislators and regulators are being challenged to an unprecedented degree and for the most part are proving unable to cope.

How, then, can they preserve the interest of the consumers and the public at large while continuing to support innovation and technological development? By embracing "agile" governance, just as the private sector has increasingly adopted agile responses to software development and business operations more generally. This means regulators must continuously adapt to a new, fast-changing environment, reinventing themselves so they can truly understand what it is they are regulating. To do so, governments and regulatory agencies will need to collaborate closely with business and civil society.

The Fourth Industrial Revolution will also profoundly impact the nature of national and international security, affecting both the probability and the nature of conflict. The history of warfare and international security is the history of technological innovation, and today is no exception. Modern conflicts involving states are increasingly "hybrid" in nature, combining traditional battlefield techniques with elements previously associated with non-state actors. **The distinction between war and peace, combatant and noncombatant, and even violence and nonviolence (think cyberwarfare) is becoming uncomfortably blurry.**

As this process takes place and new technologies such as autonomous or biological weapons become easier to use, individuals and small groups will increasingly join states in being capable of causing mass harm. This new vulnerability will lead to new fears. But at the same time, advances in technology will create the potential to reduce the scale or impact of violence, through the development of new modes of protection, for example, or greater precision in targeting.

The impact on people

The Fourth Industrial Revolution, finally, will change not only what we do but also who we are. It will affect our identity and all the issues associated with it: our sense of privacy, our notions of ownership, our consumption patterns, the time we devote to work and leisure, and how we develop our careers, cultivate our skills, meet people, and nurture relationships. It is already changing our health and leading to a "quantified" self, and sooner than we think it may lead to human augmentation. The list is endless because it is bound only by our imagination.

I am a great enthusiast and early adopter of technology, but sometimes I wonder whether the inexorable integration of technology in our lives could diminish some of our quintessential human capacities, such as compassion and cooperation. Our relationship with our smart phones is a case in point. Constant connection may deprive us of one of life's most important assets: the time to pause, reflect, and engage in meaningful conversation. One of the greatest individual challenges posed by new information technologies is privacy.

Shaping the future

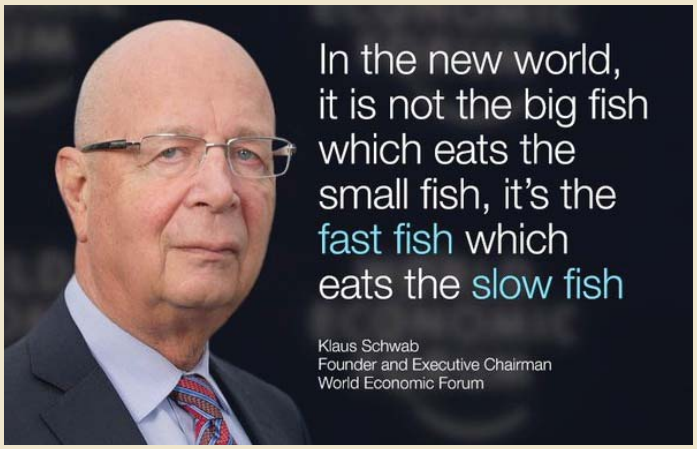
Neither technology nor the disruption that comes with it is an exogenous force over which humans have no control. All of us are responsible for guiding its evolution, in the decisions we make on a daily basis as citizens, consumers, and investors. We should thus grasp the opportunity and power we have to shape the Fourth Industrial Revolution and direct it toward a future that reflects our common objectives and values.

To do this, however, we must develop a comprehensive and globally shared view of how technology is affecting our lives and reshaping our economic, social, cultural, and human

environments. There has never been a time of greater promise, or one of greater potential peril. **Today's decision-makers, however, are too often trapped in traditional, linear thinking, or too absorbed by the multiple crises demanding their attention, to think strategically about the forces of disruption and innovation shaping our future.**

In the end, it all comes down to people and values. We need to shape a future that works for all of us by putting people first and empowering them. In its most pessimistic, dehumanized form, the Fourth Industrial Revolution may indeed have the potential to "robotize" humanity and thus to deprive us of our heart and soul. But as a complement to the best parts of human nature—creativity, empathy, stewardship—it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails.

This article was first published in Foreign Affairs
http://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond



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Some of the Speakers at The GRIHA Summit 2016

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Head, Innovative Transport Solutions

Bharati Chaturvedi,
Director, Chintan Environmental Research and Action Group

Madhav Raman,
Partner, Anagram Architects

Neeraj Bansal,
Head - Real Estate and Construction, KPMG India

Poonam Bir Kasturi,
Founder, Daily Dump

Pradeep Barpande,
Director, ELT India Enterprise

Preeti Sinha,
Senior President and Global Convenor, YES Institute

Ashok Kumar Behera,
Vice President, Head - Projects, Indian Metals & Ferro Alloys Limited (IMFL)

Neelkanth Chhaya,
Architect, Neelkanth Chhaya Architect

Bimal Patel,
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Centre Notifies A New Sustainable Sand Mining Policy

Union environment minister Prakash Javadekar announced the issue of notification for the new sustainable sand mining policy. He noted that the move was a major reform which would take care of both the development needs and the environmental concerns. Under the new policy, the states and local authorities have been advised by the Centre to use technology like android application (App), GPS and unique bar-coding system to track the vehicles of illegal miners and those who indulge in exploiting the natural resources beyond permissible limit.

News reports noted that the policy has provisions of strict monitoring of ongoing sand mining activities and crackdown against illegal operation that has reportedly been rampant in many states. **The provisions include penalty against the illegal miners which may include confiscation of vehicles carrying illegally mined sand, recovering huge amount (five to ten times of the market value of the seized minerals) and seizures of all the equipments or machineries involved in mining in non-leased areas.**

Guidelines under the new policy provide criteria for sustainable sand mining (both in-stream and off-channel extraction), giving detailed parameters which can be used by the state and central agencies for issuing mining lease for smaller and bigger tracts, respectively, keeping in mind the ecological concerns of a particular area. Besides suggesting many dos and don'ts for the authorities who grant lease to miners, the environment ministry's notification has also created an exemption list where certain categories of users may be allowed sand mining keeping in view maintenance of infrastructure, abatement of disasters and property rights. Extraction of ordinary clay or sand manually by potters and earthen tile makers, removal of sand deposited on agricultural field after flood by farmers and dredging and de-silting of dam, reservoirs, barrage and canals are kept under the 'exempt' categories in the new policy.

The ball, literally, is in the state governments' court. If they are not serious, these guidelines have no real meaning.

Infosys' New Campus Runs Fully On Solar

IT firm Infosys announced the launch of its solar PV power plant of 6.6 MW capacity at its Pocharam campus in Telangana. With this launch, combined with the existing 0.6 MW capacity roof top solar plant, **the Infosys campus in Pocharam will be one of the first corporate campuses in India that will be run completely by renewable energy.**

The plant, with a total capacity of 7.2 MW, has been successfully synchronized with the grid and is expected to generate 12 million kWh per annum. This initiative is expected to reduce the company's CO2 emissions by 9,200 tons. Currently, the company has installed 12 MW solar power plants (onsite) across its campuses and another 3 MW is expected to be completed within the next two months. This year **Infosys became the first Indian company to join the global RE100 campaign.** At the end of fiscal 2015, the company **reduced its per capita consumption of electricity by 46% and about 30% of its energy requirements are now being met through renewable sources.**

The company has 14 LEED Platinum rated buildings and four buildings with the Green Rating for Integrated Habitat Assessment (GRIHA) 5 star rating, making it a total of about 5.3 million sq.ft of buildings having the highest level of green certification. The Infosys IT SEZ at Pocharam is a 450-acre campus. The campus has been recognized **globally as one of the greenest campuses with world-class innovation in sustainability.**

Eureka Forbes Wants to Make Bharat 'Tandarust'

Eureka Forbes, India's leading health and hygiene company has launched **'Tandarust Bharat'** – a national social initiative which encompasses partnership, action and innovation towards a larger vision of creating a healthier India. The initiative is inspired by the Government of India's 'Swachh Bharat' and 'Healthy India' campaigns.

Each brand of Eureka Forbes will address different dimensions of health with unique, individual initiatives, while sharing a single, larger vision of a healthier India. Aquaguard (for safe drinking water), Aeroguard (for clean air) and Euroclean (for clean & hygienic surroundings & environment).

The company had started its first national program 'Jal Daan' - 5 Litre drinking water project to encourage individuals to donate 5 litres of clean and healthy drinking water every day to the ones who don't have access to it. For every pledge taken, Eureka Forbes will contribute Rs. 10 towards creating a corpus for installing 100 community water purification plants in urban and rural slums.

Eureka Forbes Limited has gross group turnover of Rs. 20,351 million for the year ending 31st March 2015. A part of Shapoorji Pallonji Group, Eureka Forbes' product portfolio encompasses water purification, vacuum cleaning, air purification and home security solutions. It has a base of 15 million customers, a reach of over 1,500 cities and towns in India and a global footprint across 53 countries.

Wipro to Fund Sustainability Research at IIM-B

The Indian Institute of Management Bangalore (IIMB) has partnered with IT major Wipro for boosting research initiatives as part of its doctoral programs. Following the tie-up, the company will support the Wipro Sustainability Fellowship and the Wipro Sustainability Grant for Fellow Program in Management (FPM) students to research on the broad area of sustainability.

Professor Shashidhar Murthy, IIMB's FPM Chairperson, said, "We at IIMB are glad that Wipro values our students and the nurturing provided by our faculty. We thank Wipro for their generosity. This will provide an impetus to students' research in the area of Sustainability."

PS Narayan, Vice President and Head-Sustainability, Wipro Limited, said, "The business sector has a critical role to play in facing the manifold challenges of sustainability. Therefore, embedding sustainability in management education has become a critical imperative."

CEO-led Body to Drive Sustainability in India's Housing Sector

International Finance Corporation (IFC), a member of the World Bank Group, is convening a voluntary, collaborative effort with leading Indian housing sector companies to form an industry-led Sustainable Housing Leadership Consortium to drive sustainability in India'shousing market with a particular focus on the affordable housing sector. The effort is part of IFC's Eco-cities program, supported by the European Union.

The consortium has been formed by early contributors in India's green building and affordable housing movement – Godrej Properties, Mahindra Lifespace Developers Limited, Shapoorji Pallonji Real Estate, Tata Housing Development Company, and VBHC Value Homes Private Limited. **IFC will leverage private sector investments to facilitate greater uptake of certified green buildings, facilitate policy dialogue between the private sector and the government, evaluate technology levers and share best practices, raise public awareness, and identify strategic actions for implementation.**

"Buildings contribute to about 30-40 percent of energy consumption in many Indian cities and about 22 percent of the country's annual greenhouse gas emissions. We appreciate and support the efforts of these leaders," said Johann Hesse, Head of Cooperation of the European Union in India.

The founding members of the consortium have committed to make 100 percent of their housing portfolio sustainable by 2017 through appropriate green-building certifications and achieve 20 percent reduction in incremental variable costs.The consortium will also provide leadership and advocacy for broader industry and government policy actions to make 20 percent of India's new housing construction sustainable by 2022.

Snapdeal to Sell LED Bulbs At Rs.99

In an effort to speed up purchase of LED bulbs and ensure efficient distribution, the ministry of power has tied up with ecommerce giant Spapdeal. Under the campaign, Snapdeal will be selling LED bulbs at Rs 99 in 5,000 towns and cities of India."

The partnership with State-run Energy Efficiency Services Ltd (EESL) enables the government to promote efficient lighting, enhance awareness on using LED to reduce electricity bill. EESL is implementing the Centre's Domestic Efficient Lighting Programme (DELP).

Why LED? What are the advantages?

	LED (Under DELP Scheme)	CFL	ICL
Watt	7	14	60
Energy Efficiency	88%	50%	0%
Annual Cost Savings of Elecricity Bill Per Bulb	Rs. 162.00	Rs. 85.50	Nil
Life Expectancy (Hrs)	50,000	8,000	1,200
Free of Cost Warranty	3 Years	1 Year	Nil

SKF Starts 1 MW Rooftop Solar

SKFIndia inaugurated one of the largest rooftop solar installations, among manufacturing companies, in Pune. The launch of the project is a **part of SKF India's ongoing solar mission across** all major facilities in the country. The installation in the Pune facility is expected to generate 1.5 GwH units per annum. This initiative is expected to **reduce the Pune facility's $C0_2$ emissions by approximately 1200 metric tons per annum.**

Earlier, SKF installed a rooftop solar plant at its Bengaluru facility and along with the Pune plant; the combined capacity is 2.1 MW. Additionally, SKF has also installed a hybrid solar thermal plant at its Mysore facility with obtained energy of 120 MwH per year.

Commenting on SKF's efforts to ensure sustainable development, **Rob Jenkinson, Director, Corporate Sustainability**, said "Sustainability is a long-term commitment for SKF. Our environmental strategy **SKF BeyondZero is to create a positive impact on the environment**, by reducing the negative impact from our own operations and offering innovative technologies, products and solutions with improved environmental performance. The solar mission is directly aligned with our sustainable business goals."

No Indian Company in World Top100 Sustainable Companies

Corporate Knights released the Global 100 Index, which ranks the world's most sustainable companies according to 12 environmental and financial indicators. The top 10 included the following:

Top 10

BMW
Dassault Systems
Outotec
Commonwealth Bank of Australia
Adidas
Enagas
Danske Bank
StarHub
Reckitt Benckiser Group
City Developments

Top brands in 100

Siemens
Unilever
Johnson and Johnson
Johnson Controls
General Electric
Apple
Hewlett Packard

No Indian company made it the list. The Global 100 index (which is equally weighted) commenced on February 1, 2005. The Global 100 is calculated by **Solactive**, the German index provider.

The ranking is maintained by *Corporate Knights*, a Toronto-based media and investment advisory company.

http://www.corporateknights.com/reports/global-100/2016-global-100-results-14533333/

News

Sikkim First Organic Farming State

On 18 January 2016 Sikkim was declared as the first organic farming state of India. The declaration was made by the Prime Minister Narendra Modi while inaugurating the Sikkim Organic Festival 2016 in Gangtok, Sikkim. The Prime Minister also handed over the Organic Certificate to Sikkim Chief Minister Pawan Chamling.

Prime Minister Naredra Modi inaugurates Sikkim Organic Festival 2016 and handed over commendations to Chief Minister of Sikkim, Shri Pawan Chamling

The Sikkim Organic Festival 2016 was held on the sidelines of the 2-day long **National Conference on Sustainable Agriculture and Farmers Welfare** that began on 17 January 2016. The conference was attended by agricultural scientists, State Agriculture Ministers, Agriculture Production Commissioners and Agriculture Secretaries among others.

Some new initiatives such as issue of Soil Health Cards to all farmers in all 14 crore farm holdings regularly in a cycle of 2 years, introduction of the Neem Coated Urea scheme, implementation of the **Paramparagat Krishi Vikas Yojana** for **promoting organic farming in the country**, efficiency and implementation of the National Agriculture Market for setting up of a common e-market platform, have been introduced for the long term benefit of the farmers.

Abu Dhabi Bank Pledges $10 Billion For RE

The National Bank of Abu Dhabi has made a US$10 billion, 10-year pledge to finance renewable energy and other sustainable business activities.

The bank said it would lend, invest and facilitate US$10 billion of financing in environmentally sustainable projects in the so-called West-East corridor, which stretches from Africa, through the Middle East to Asia. Last year the bank published a report with Cambridge University and consultancy PwC, 'Financing the Future of Energy', which identified a massive US$48 trillion funding gap over the next 20 years to meet global energy demand. Renewables accounts for over half of this figure, the report said.

"The world is heading towards a very significant funding gap for energy globally," said the bank's CEO, Alex Thursby. "This is particularly true across the West-East Corridor, the rapidly growing super-region that stretches from Africa through the Middle East to Asia – and filling it is going to be a big task. As the leading bank in the Middle East, we want to make a real contribution to the region's ability to rise to the energy challenge.

"We believe that even in the current climate of low oil prices, the transition towards more renewable sources in the energy mix will continue because the underlying drivers are long-term and strong. It is for this reason that we have made this commitment of US$10bn today. Through our Sustainable Business team we hope to become a positive force in the banking sector in the region, accelerating the transition to a much needed new world of energy." The bank recognizes that sustainable business is wider than just renewables and includes activities like clean transportation, sustainable water, waste management and energy efficient real estate.

Levi's Has Largest Green Distribution Center

Levi Strauss & Co.'s Sky Harbor Distribution Center in Nevada has received the U.S. Green Building Council platinum Leadership in Energy and Environmental Design award for reducing carbon emissions and improving overall sustainability.

At roughly 620,000 square feet, **it is the largest distribution center in the world** to receive the platinum-level award from the council, a national nonprofit that certifies and rates buildings for sustainability. "Our goal, as a company, is to be the most sustainable apparel company in the world," said **Levi Strauss vice president of sustainability Michael Kobori.**

Originally topped with black roofs that absorbed the Las Vegas summer sun, the facility was not meant to be a sustainable building when it was built in 1994. Around 2007, Levi Strauss started discussing how it could become more sustainable and efficient. The company realized that 40 % of its carbon footprint came from its distribution centers. Changes to the building started in 2010, with the company installing several slow-spinning, 24-foot fans that help keep the temperatures low and converting the all black roof to a more reflective white. Kobori told media that the building diverts more than 90% of its waste from landfills by either recycling or composting instead. Retrofitting the building and other smaller initiatives, like having employees bring their used batteries from home to recycle at work, got Levi Strauss the recognition.

http://www.proudgreenbuilding.com/news/levis-distribution-center-honored-for-sustainability/

Energy Systems More Vital than RE

Over the next 30 years, two-thirds of all new energy supply could come from renewable sources. **Fatih Birol**, Executive Director, International Energy Agency, Paris, said that far from being a romantic dream, renewables were central to meeting the energy demands that the Fourth Industrial Revolution would bring. Speaking at Davos 2016 Birol explained that the bulk of new installations - more than two-thirds - come from emerging countries.He added. "To meet climate change and growth targets, around 40% of future energy supply must come from zero-emission technologies."

But **Hiroaki Nakanishi**, chairman and chief executive officer at Hitachi, Japan and co-chairman of the World Economic Forum Annual Meeting 2016, said there had been a shift in the challenge. He said it was **no longer about having more renewable energy, but rather having better energy systems**. The challenges faced by industry involved such issues as overcoming the hurdles faced as a result of the distance between generation sites of wind and solar energy and load centers.**"A more systematic approach is required to integrate renewable energy sources into an overall smart grid,"** he stressed.

Ignacio Sánchez Galán, chairman and chief executive officer, at Spain's Iberdrola explained that over the next 25 years, energy demand would increase by more than 80 percent globally."More renewable energy means more investments in electric grids to manage loads and demands," he added.

China, which has suffered increasingly from serious air pollution problems in its capital Beijing, is set to play a leading role in the transformation towards green and renewable energy, according to Eric Xin Luo, chief executive officer at China's Shunfeng International Clean Energy. "The country has set an ambitious target that 25% of all energy production comes from renewable sources," he explained. Despite its problems in the capital, China is a leading exporter of clean energy technology – for instance it manufactures more than 60 percent of the world's solar panels.

Global Coalition to Halve Food Waste

30 CEOs, government ministers, global institution executives, and civil society leaders will increase political and social momentum to achieve Target 12.3 of the UN Sustainable Development Goals which aims at halving per capita food waste and reduce food losses by 2030.

Globally, a third of all food is lost or wasted between the farm and the fork. Reducing food loss and waste can be a triple win: It can save money for farmers, companies, and households; wasting less can feed more people; and reductions can alleviate pressure on climate, water, and land resources.

Champions 12.3 will complement and build upon ongoing successful UN programs to reduce food loss and waste including SAVE FOOD & Think. Eat. Save, efforts such as EU FUSIONS and the global Food Loss & Waste Protocol, private sector action like the Consumer Goods Forum's Food Waste Resolution, and other initiatives.

See the full list of champions and get more information at: www.champions123.org.

Global Body To Study Case for Businesses to Back SDG

The Global Commission on Business and Sustainable Development is setting out to articulate and quantify the compelling economic case for business to engage in achieving the Sustainable Development Goals (SDGs) by 2030

The initiative aims to explore current and future disruptive business models, understanding what they mean for sustainable development; and to map out new financing mechanisms the world will need to reach the SDGs. It will investigate changes in core business operations and behaviors that go far beyond traditional corporate social responsibility and voluntary partnerships.

The UN Foundation, the World Business Council for Sustainable Development (WBCSD), the Overseas Development Institute and The B Team are supporting the effort, to help mobilize the business community and the next generation of entrepreneurs, to support achievement of the global goals by 2030.

The Commission was launched at the World Economic Forum in January 2016 and intends to report back with its findings and analysis at WEF 2017. It will be co-Chaired by Mark Malloch-Brown and brings together international leaders from business, labor, financial institutions and civil society.

It will present a comprehensive report in one year's time, outlining new business and financial models, as well as market opportunities for companies who are invested in sustainable approaches.

The Commission will conduct foundational research, and engage in fact-finding dialogue with a diverse cross-section of key stakeholders, including business leaders, investors, civil society representatives, social entrepreneurs and academic experts.

"There is no business case for enduring poverty. Business can unlock trillions of dollars through new markets, investments and innovation - but to do so we must challenge our current practices and address poverty, inequality and environmental challenges." Paul Polman, CEO, Unilever

Supporters

Overseas Development Institute is the UK's leading independent think tank on international development and humanitarian issues.

The B Team is a not-for-profit initiative formed by a global group of business leaders to catalyze a better way of doing business, for the wellbeing of people and the planet.

Unilever, The United Nations Foundation and The World Business Council for Sustainable Development

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Vineet Rai, founder, Aavishkaar and Intellecap Group, is one of the commissioners of the Group.

http://www.businesscommission.org/

India Cannot Afford 'Grow Now, Pay Later' Model

From left to right: Ajay Mathur, Jairam Ramesh, Padma Shree Suman Sahai, Valmik Thapar, Alex Shoumatoff

India is indeed in a conundrum. Should it adopt the China model of fast growth without worrying about its impact on the ecosystem or care so much for the ecosystem that fewer people are able to come out of poverty. Political leaders too are in a quandary. They've been voted on the growth plank and have to satisfy their constituency if they are to get back to power but they don't want to be seen as rampant destroyers of the ecosystem either. Is a balance between growth and ecology protection possible? India is a land which taught the world of the concept of the 'Golden Mean'. Can it now demonstrate it? Does it have an option not to do so?

These were some questions that a panel of eminent people addressed at a session on **'Red Signals Green Hopes.'** The panel members were former environment minister Jairam Ramesh, influential writer on ecology Alex Shoumatoff, TERI head Ajay Mathur, wildlife activist Valmik Thapar and moderated by Gene Campaigner Padma Shree Suman Sahai.

There is a huge gap between our enthusiasm to pass environment friendly legislation and our enthusiasm to enforce them. Reason for that is – in the short run – there is perceived conflict of jobs, getting investment and pushing GDP growth versus protecting environment.

There is no conflict actually. However, there is mindset in all governments that there is indeed a conflict between the two issues. Governments, irrespective political ideologies, pay obeisance to ecology but end up going for pushing GDP growth.

There is huge temptation for grow now pay later model. Everyone did it, including Europe and US.

Why we need to be different and there is a need for widespread recognition of why we need to be different:

a. Demographic – there is no country in the world which has a growing population as India. So sustainable development is not a luxury but a necessity.
b. We may have not contributed to the climate crisis today but still we have had huge impact on our monsoon, glaciers etc. We are vulnerable.
c. There is an enormous public health impact – air and water pollution are silent killers.
d. There is an argument of livelihoods – in the West environment protection is about lifestyles, but in India it is largely about livelihoods.

The dominant discourse in India is that we cannot afford the 'grow now pay later model. We need to grow by 8 percent and at the same time protect the environment. It is possible. India must make up its mind.

One of the ways this can be achieved if systems of public participation applies pressure on governance system.

India has a very vibrant society. Every great milestone on environment has been influenced by civil society organizations. But some civil society organizations seem to think they have the right to tell the governments what to do. Civil society must have their say, but democratic governments should have their way.

But unfortunately, the space for civil society seems to be shrinking, which is a concern.

India has a strange problem. Even if we meet all our targets of renewable energy, our coal consumption will have to go up 2.5 times in the next decade.

There's a Need for Green Officer in Every District

Valmik Thapar is a naturalist, conservationist and writer. He is the author of 14 books and several articles.

Our biggest problem is bureaucracy. We need a mechanism of governance to bring about change in every district in India. The level of ignorance among the bureaucrats is huge. The 5 to 8 million government servants need to be educated about climate change. The vicious stranglehold of bureaucracy, which is holding up change, has to be loosened.

We have 700 districts. We can make a start by seeing how budgets are administered. We need a green officer in each district to monitor all environment related issues and report regularly.

India should Lead the World With New Business Models

Ajay Mathur, new Director of The Energy and Resources Institute (TERI)

Ordinary citizens can make a big impact. For example, if every citizen buys the LED bulb on the EMI scheme of Rs 10 a month as part of their electricity bill, we can save a lot of power. What we save is higher than what we pay for power in a year.

Some state governments like Delhi have started this scheme. Citizens can demand it from their electricity providers. It is possible to make the difference if people start adopting new models.

I would like India to be the leader in finding solutions to growth vs. ecology debate. It is a huge opportunity for creating new business models for the world.

If You Write People Take Note

Alex Shoumatoff is an American writer known for his literary journalism, nature and environmental writing, and books and magazine pieces about political and environmental situations and world affairs. He was a staff writer at **The New Yorker magazine** from 1978 to 1987, a founding contributing editor of **Outside magazine** and **Condé Nast Traveler**, and is currently the senior-most contributing editor to **Vanity Fair** where he has been since 1986. He is known for reporting on some of the most remote corners of the world.

He said if articles are written well based on research, leaders do take note. After his article on ivory trade and its impact on African elephants, Hong Kong, the hub of ivory trade, banned it.

He said India can make a big difference to East Asian environment, by buying palm oil from registered sellers and even cutting down its consumption.

His dispatches are widely read http://www.dispatchesfromthevanishingworld.com/whois/

The Good and the Not-so-good of the New Power Tariff Policy

The amendments to the National Tariff Policy have been a mixed-bag of boons and banes for the Indian power sector. The new policy draws from some of the past successful schemes and steps them up a notch. Although it is a very safe move, it misses out on the opportunity to bring in any fresh thought into the mix.

By Rudranil Roysharma and Aditya Ravindran

Electricity

Positive Aspects:

- Targeting 24x7 power supply to all has always been a welcome step and this would in general boost the demand and economic prosperity of one of the least per capita power consuming countries in the world i.e., India.
- Responsibility of the regulator would be focused on how they can make power more affordable to the Bottom of Pyramid (BOP) consumers.
- Investment risk for the micro grid developers faced when the grid reaches to the remote location has been taken care of, and this would help more investment and participation in the micro grid sector.

Negative Aspect:

- Coal washery rejects based power plants would indeed be helpful in supplying inexpensive power to the community, but the high ash-content fuel being used would mean that in some ways it acts against the Environmental objective of this policy.

Efficiency

Positive Aspects:

- Higher focus has been given on the transmission sector and rightly so. These steps would help the sector to transform it into an enabler from a bottleneck. This move would reduce congestion and share of un-utilized or un-requisitioned power in the system resulting in lower cost of power.

- Expansion of existing power plants is a welcome step, given that the hurdles like fuel availability, pricing aspect and a mechanism to minimize the impact of fuel price hike are taken care of.
- Lower power cost resulting from better transmission networks and implementation of UDAY scheme will see more PPAs, which would finally reduce the investment risk of the developers and will help in the overall growth of the sector.
- A better transmission network would result in a stronger spot power market, with better interconnection between the generators and consumers. This would help the generators to increase PLF of the existing plants, and recover energy cost and earn better profits at the same time.

Additional Expectations:

- Faster installation of smart meters and ToD metering will help in shaving the peak power demand, however the policy is silent on the implementation part and who will finally bear the cost for implementation of smart meters at such large scale.
- This section could have helped in many other ways to tackle the hurdles being faced in demand-side management programs, which seems like a missed opportunity with this amendment.
- Another futuristic concept that could have been addressed under this head is what has become a common practice in much developed countries, where power generation at grassroots level with the objective of self-consumption is giving rise to a breed of “pro-sumers”

Environment

Positive Aspects:

- The policy is another push by the Government to increase renewable power installation in the country and improve share of renewable power in the energy mix. The Government is trying its best to make solar and wind power more affordable and accessible.
- The plan to make renewable power affordable may lose its relevance in coming days as cost of power from renewable energy sources is touching new lows day after day.
- Hydro power segment is traditionally surrounded by many more uncertainties as compared to any other conventional power plants. Tariff forecast is quite difficult here; hence cost-plus method will help to revive the sector and will reduce investment risk for the developers. This will also attract IPPs to invest in this segment

Additional Expectations:

- The environment aspect of the policy seems to be more about pushing the agenda of renewable energy, Swachh Bharat and Namami Gange Missions, while ignoring any measures for improving the environmental impact of the existing plants. Aging infrastructure means there are more of old polluting plants every year.

- Implementation of Waste-to-energy plant by MNRE did not see any remarkable growth in the past due to some inherent challenges of the industry like availability of wastes, improper segregation facilities, poor technical know-how etc. Some strong push would be needed to get this technology moving. Similar is the case with ancillary services.
- Hydro power projects are reeling under much bigger problems, most of which stem from environmental clearances and R&R issues. Till a trade-off is achieved between the environmental impact and economic gains, hydro power project will not pick up steams, and the policy fails to address that. The policy is silent on execution related challenges and its mitigations.
- The renewable power growth story will be halted without a proper policy on storage / banking. This policy is silent on that aspect.

Ease of Doing Business

Positive Aspects:

- Incidentally, coal rich eastern states are also the states which are lagging in economic development. This policy, with its focus on such states, would create more employment in those states and will finally help in inclusive growth.
- Pass through mechanism will reduce the risk of bidders from unforeseen circumstances, and we will help in increasing participation in future.

Negative Aspect:

- Coal-rich states are already in a state of power-surplus. More pit-head power plants would indeed provide power at lower tariffs, but lack of evacuation infrastructure being a bottleneck at present, this may result into lot of unutilized / lost generation in the system

Additional Expectation:

- The risks faced by projects under competitive bidding are much larger from international sources and foreign exchange fluctuations. Pass through of change in domestic taxes, duties and levies do not address such major uncertainties.

Rudranil Roysharma and Aditya Ravindran are with Feedback Consulting
www.feedbackconsulting.com

Climate Change is More Local Than Global

We need to do more at the local level to minimize effects of climate change than only worry about CO_2, says Prof. J. Srinivasan, Chairman, Divecha Centre for Climate Change, Indian Institute of Science in his talk at an interactive session on 'Outcome of Paris Summit on Climate Change (COP21)' and it's Implication for India. It was organised by the Centre for Sustainable Development, Bangalore.

If you look at the possible global temperature rise that will occur in the next 25 years, even maintaining a 2 degree Celsius rise will be tough. For the past 20-30 years, we are going along a trajectory of 4-6 degree Celsius temperature rise and now reducing this to 2C will not be achieved easily. So, how can we limit the rise to 1.5C?

The Paris Summit consensus was that we will have to limit our cumulative CO_2 emission to 1000 Gigatonne (Gt) in order to limit to 2 degree Celsius. In order to achieve 1.5C, we will have to limit it to 750 Gt.

The reason that the figure of 1.5C came to be is because a large number of island nations in the UN are concerned about sea-level rise and they made an emotional pitch saying that they would disappear from the face of the planet if the sea-level continues to rise.

The Case of Bangladesh – impact of dams more serious than rising sea level

Bangladesh is also one of the countries which would be affected. India too should be concerned about the issue as we have a large number of cities on the coast whose population exceeds 1million; a sea-level rise of one metre as predicted by IPCC will pose a big threat to many towns.

However, I would like to point out that there is a lot of confusion in the discussion about climate change because ultimately the impact of climate change is local more than global. When we talk about local climate change it is not just about CO_2, it includes many other factors as well. One good example is Bangalore itself, the minimum temperature in March has gone up by almost 2C,this cannot be just because of global warming.

Bangalore Chaotic Traffic

So when you look at local issues all one has to worry about are the factors other than CO_2 and these are factors which do not require global negotiations. These are things that we can do on our own. **In Bangalore the temperature rise can be controlled better with better urban**

Key Ideas

- **Limiting temperature to 2 degree Celsius is a joke**
- **Intervene at the local level to minimize climate change impact**
- **Tipping point of severe impact can be faster than we expect**
- **Gases other than CO_2, like methane, are not part of the Paris Summit, but have serious consequences**

planning. Similarly, Bangladesh faces threat of rise of sea-level rise not only because of global warming. Global warming is currently raising the sea-level by 3mm/ year approx. but most of Bangladesh is sinking at the rate of 10mm/year or more. Why is that?

Bangladesh is sinking for 3 reasons – dams have been built upstream of Brahmaputra and Ganga which affects silt coming into Bangladesh, irresponsible tapping of ground-water from under the soil and exploitation of natural gas by pumping below the ground. So, in Bangladesh local threats need more urgent attention as compared to long term effects of global warming. The Bangladesh population rise is 20 million/10 years. This is an issue that also needs to be addressed.

Tipping Point Can Be Earlier Than Expected

Scientists who have studied the earth's past know that it has oscillated between ice-ages and ice-free conditions and when these oscillations occurred long time ago, they occurred quite rapidly. There is a concept of tipping point - the earth's climate changes due to human abuse of natural causes, first slowly and then comes a tipping point at which it changes rapidly. Thus, we need to be cautious about the fact that earth's climate might not be as stable as we think. A few examples of tipping point are Indian Monsoon change.

But, one of the most rapid changes attributed to tipping point was the ozone hole. It was predicted by scientists that due to release of CFCs (chloro fluoro carbon) ozone layer will slowly decline. However, the layer declined rapidly in 1980. There was this huge hole in the ozone layer over Antarctica which was not predicted by the scientists. So, the scientists who warned us had done so very conservatively. **This also proves that the projections made by Intergovernmental Panel on Climate Change (IPCC) based on models may not be right, it could be much worse.**

Hence, the 2C might be a liberal allowance. Even in the case of global climate change, we will get serious only when there is a catastrophe which may happen in next 10-20 years.

Some threats that we should be concerned about are – Indian Monsoon weakening, release of methane from Permafrost in Russian, frozen soil from ice age is beginning to defrost which will lead to release of methane trapped under them.

According to a recent study, to limit temperature rise to 2C, very ambitious cuts in levels of CO_2 might not be enough. However, to go below 2C, along with CO_2 the level of short-lived climate pollutants such as methane and black carbon (soot) in the atmosphere needs to be limited as well. Soot remains for one week and methane for ten years. Now, this is a tough issue as these gases are not part of the negotiations in Paris.

With respect to India, it's high time we bring down the levels of soot in the atmosphere as it causes health issues as well. One of the recent examples is the climate change in Delhi.

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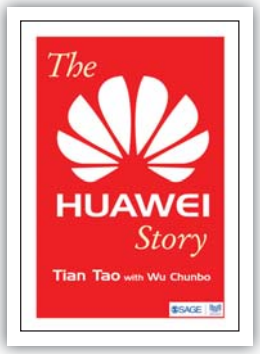

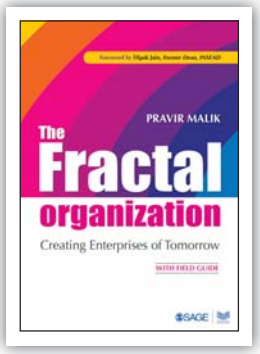

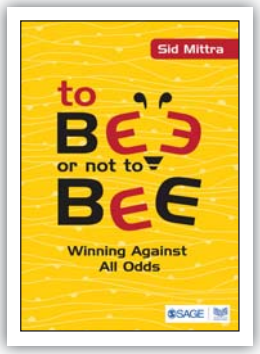

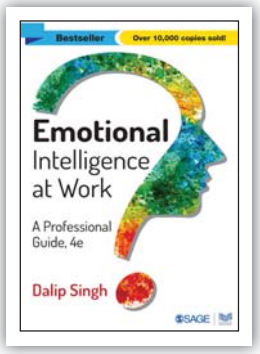

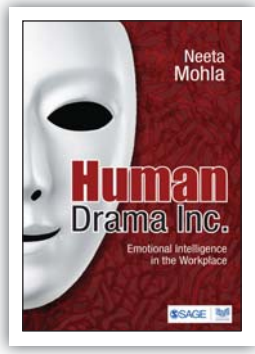

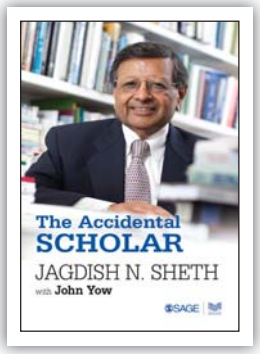

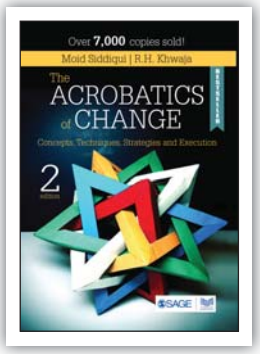

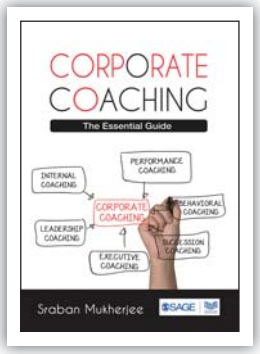

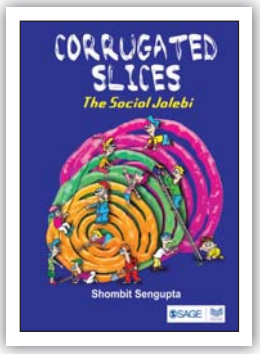

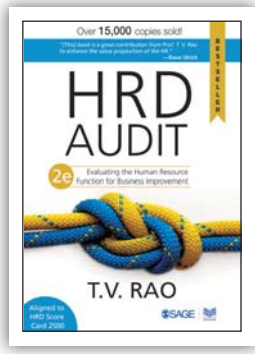

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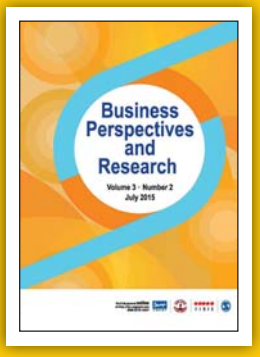

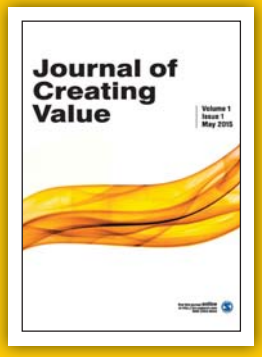

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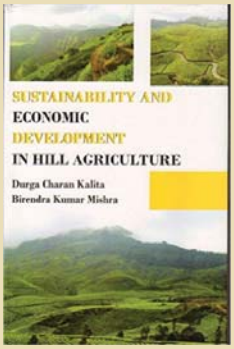
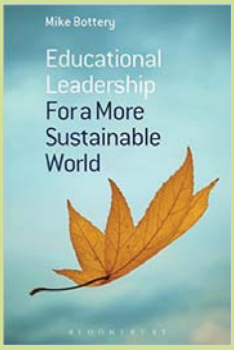


Sustainability and Economic Development in Hill Agriculture

by Durga Charan Kalita, Birendra Kumar Mishra, Biotech Exclusively Distributed by Astral International Pvt. Ltd., January 2016

Hill agriculture is facing the twin challenges of eco-environmental hazards and loss in productivity. The development of agriculture in hilly areas has been constrained by several factors which include lack of scientific land use according to capability, lack of economic and social institutions, lack of incentives, proper training and extension education, loss of support area for the forest dwellers and risk and uncertainty in hill farming system. Farming systems in hills offer vast scope for adoption of a diverse mix of farm enterprises including crop cultivation and vegetable farming, horticulture and livestock. The production potential of hill agriculture has not been exploited fully due to several constraints.

The thirty five papers included in this volume, apart from a few are mainly based on field studies, conducted in the hill areas of North Eastern Region, identify the constraints in the development of hill agriculture and suggest measure to overcome them. Few papers are from the hill areas of other states of the country. Most of the papers deal with agribusiness opportunities, role of NGO's, resource conservation, homestead agro-forestry, shifting cultivation which seems to have a greater impact on sustainability of hill agriculture.



Educational Leadership for a More Sustainable World

by Mike Bottery, Bloomsbury Academic, February 2016

Educational Leadership for a More Sustainable World argues that current crises in educational policies and practice, including the recruitment and retention of educational leaders, ultimately derive from the interactions between four key challenges which also underpin current global and societal issues of sustainability:

- A culture of consumption
- Global energy demands
- Climate change
- Emerging population patterns

Mike Bottery argues that problems in dealing with these four global challenges, as well as many crises in education, are in large part due to a failure to appreciate their complex interactions and effects, and of the need for sufficiently complex responses. The result is that many policies in many areas hinder rather than facilitate appropriate solutions.

However, by showing that the dynamics of crises in educational sustainability have many similarities to those of global systems, this book argues that the adoption of a number of core practices and values can help educational leaders develop greater sustainability, not only in their own area of activity but can also help them make a valuable contribution to greater sustainability at the global level as well.

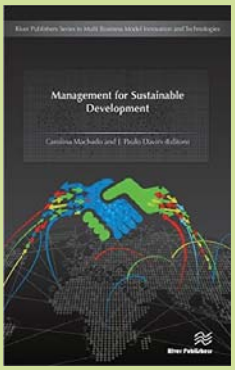
Eco Living Japan: Sustainable Ideas for Living Green

by Deanna MacDonald, Tuttle Publishing, February 2016

Japan is equally as well known for its ecologically-sensitive traditional homes as it is for cutting-edge, green technology. Eco Living Japan presents 19 contemporary Japanese houses which exemplify the most recent trends in sustainable design in Japan. This is wabi-sabi for the 21st century!

With over 250 photos, drawings, plans and lively, informative text, this sustainable architecture book offers a picture of green living in contemporary Japan and provides inspiration and practical ideas for those creating homes in North America and other 4 season climates. Each project presents different aspects of Japan's current movement toward a more sustainable living environment as well as its focus on fine craftsmanship and cutting-edge technology.

The book's content is informative and enjoyable for both professional architects and forward-thinking homeowners. Anyone with an interest in Japanese design and trends in sustainable living will find fresh ideas for their own home projects. These homes work in harmony with their environments and with the people who inhabit them— "green design" at its best!



Management for Sustainable Development (Multi Business Model Innovation, Technologies and Sustainable Business)

by Carolina Machado, J. Paulo Davim, River Publishers, January 2016

Conscious of the environment where we live everybody looks to find the best solutions to solve problems that result from Human evolution. Sustainable development is understood to be people centred. We have a special concern with cultural, social and economic dimensions, where individuals can develop, together as a society, whilst at the same time individual and organizational activities can be implemented without destroying the present diversity and complexity of the ecological system where we live.

This book looks to cover issues related to the management for sustainable development such as the re-use, recycling, waste reduction, added value, low costs and time of production, sustainable behaviour, not only in an environmental perspective but also in an organizational perspective. Managing for a sustainable development appears as a management philosophy focused in productivity improvement considering different kinds of goals, such as biological, economic and social systems goals. This book contributes to the exchange of experiences and perspectives about the state of research related to the management for a sustainable development, as well as the future direction of this research field.

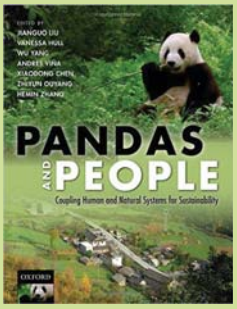
It looks to provide a support to academics and researchers, as well as those operating in the management field and who need to deal with policies and strategies related to sustainable development issues.

A Smart Energy System for Sustainable Buildings: The Case of the Bernoulliborg

by Faris Nizamic, Rijksuniversiteit Groningen, Bibliotheek, January 2016

Today's buildings are responsible for more than 40% of the world's total energy consumption. Current systems that manage equipment in buildings fail to reduce unnecessary energy consumption while at the same time maintaining the comfort of those using the buildings. This is usually because the existing systems cannot cope with the changes caused by interactions between people and the building environment. Furthermore, people using buildings are not sufficiently aware of how much buildings consume and of what concrete actions could help to reduce this consumption. Moreover, current building management systems do not take into account feedback from building users and their preferences regarding the conditions in their working environment. We designed and implemented a smart energy system to overcome these gaps.

Our system took into account the behavior of building users so as to provide automated control of energy consumption and other processes within an actual building. With this system we also provided user dashboards to serve as a means of communication between the building and its users. In addition to reducing energy consumption we also introduced related optimizations such as reduction of water consumption and improvement of waste management, using the same system principles. We installed a prototype of this system in a modern university building, the Bernoulliborg, to show how such a system is realizable in actual working office space. This building served as the evaluation platform for our research.



Pandas and People: Coupling Human and Natural Systems for Sustainability

by Jianguo Liu, Vanessa Hul, Wu Yang, Andrés Viña, Xiaodong Chen, Zhiyun Ouyang, Hemin Zhang, OUP Oxford, January 2016

Understanding the complex relationships between humans and the natural world is essential for achieving environmental sustainability and improving human well-being, yet many studies are unable to reveal complex interactions and hidden trends. This is the first book to synthesize the findings and approaches of long-term integrated research in a model coupled human and natural system, and to illustrate their applications to regional, national, and global scales. It features a classic long-term interdisciplinary research project in the Wolong Nature Reserve of China, which contains one of the largest wild populations of the world-famous endangered giant pandas.

Bringing together a team of contributors from both the natural and social sciences, this book explores how a long-term interdisciplinary and model system approach is essential to uncover the common patterns and mechanisms of coupled systems, to develop ideas and methods for studying and managing other coupled systems, and ultimately to contribute to the development of theories about coupled systems for sustainability.

Pandas and People will be essential reading for scholars interested in the interface of the natural and social sciences, including ecologists, conservation biologists, environmental scientists, sustainability scientists, wildlife biologists, forest scientists, sociologists, anthropologists, economists, and political scientists. It will also be a valuable reference for policy makers, natural resource managers, and graduate students.

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Indian Manufacturer of The Year Award		
Toyota Kirloskar Motor Pvt. Limited	Bangalore	Indian Manufacturer of The Year Award
Mahindra & Mahindra Limited	Igatpuri	Indian Manufacturer of The Year Award - 1st Runner up
Future Ready Factory of the Year Award		
JCB India Limited	Ballabgarh	Future Ready Factory - Platinum Award | Engineering Sector, Mega Large Business
Mahindra & Mahindra Limited, Plant 1	Nashik	Future Ready Factory - Platinum Award | Automotive Sector, Mega Large Business
Mahindra & Mahindra Limited	Haridwar	
ITC Limited - India Tobacco Division	Bangalore	Future Ready Factory - Platinum Award | FMCG Sector, Mega Large Business
	Saharanpur	
	Kidderpore	
Pfizer Limited	Goa	Future Ready Factory - Platinum Award | Pharma Sector, Large Business
		Consistency Award |Aspirer
SKF India Limited	Pune	Future Ready Factory - Platinum Award | Engineering Sector, Large Business
Hindustan Coca Cola Beverages Pvt. Limited	Ameenpur	Future Ready Factory - Platinum Award | FMCG Sector, Large Business
Subros Limited	Noida	Future Ready Factory - Platinum Award | Auto Ancillary Sector, Medium Business
Gold Awards		
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Essar Oil Limited	Vadinar	
Bharat Aluminium Company Limited	Korba	Gold Award | Metals Sector, Mega Large Business
Hindustan Unilever Limited	Barotiwala	Gold Award | FMCG Sector, Large Business
Johnson & Johnson Pvt. Limited	Baddi	Gold Award |1st Runner Up - FMCG Sector, Large Business
Dr. Reddy's Laboratories Limited - FTO 2	Hyderabad	Gold Award | Pharma Sector, Large Business
Schneider Electric IT Business India Pvt. Limited - IDF 4 & 5	Bangalore	Gold Award | Engineering Sector, Medium Business
Philips India Limited	Vadodara	Gold Award | Engineering Sector, Medium Business
Johnson & Johnson Pvt. Limited	Mulund	Gold Award | FMCG Sector, Medium Business
Raychem RPG Pvt. Limited	Vasai - East	Gold Award | Engineering Sector, Emerging Business
Schneider Electric India Pvt. Limited	Hyderabad	Gold Award - 1st Runner Up |Engineering Sector, Emerging Business
SKF India Limited	Haridwar	

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Course

Science and Management for Sustainable Living
www.bhoomicollege.org

Post Graduate Diploma Course in Sustainable Development (PGDM-SD)
http://bimtech.ac.in/

M.Sc. in Sustainable Development - Distance learning Course + information
The Global Open University
http://nagaland.net.in/

Post-Graduate Certificate in Sustainable Enterprise
Indian Institute for Sustainable Enterprise
http://theiise.net/pgcertinse.html

Postgraduate in Sustainability Management
Silver Bright Institute of Management
http://www.htcampus.com/college/silver-bright-institute-management-sbim

Post Graduate Diploma in Sustainability (Distance learning)
Chhattisgarh University
http://www.cguniversity.com/

Post Graduate Diploma
IGNOU- Indira Gandhi National Open University
http://www.ignou.ac.in/

MBA in Environmental Science
School of Management & Infrastructure and Development Studies
http://www.minds-india.org/

Master of Architecture (Sustainable Architecture)
Bharati Vidyapeeth Deemed University
http://www.bharatividyapeeth.edu/Campuses/Pune/default.aspx

MBA and MA in Sustainability Management
TERI University
http://www.teriuniversity.ac.in/

M Tech, MSc Environmental Science
Thapar University
http://www.thapar.edu/

PG Diploma
Entrepreneurship Development Institute of India
http://www.ediindia.org/

M Tech in Environmental Engineering
The National Institute Of Technology, Tiruchirappalli
http://www.nitt.edu/home/

Advanced Diploma in Bio Degradable & Solid Waste
Vellalar College for Women
http://www.vellalar.com/Arts/carrer-oriented-programmes.php

PhD in Environmental Science
Gauhati University
http://www.gauhati.ac.in/

MSc in Environmental Science
Dr Babasaheb Ambedkar Marathawada University
http://www.bamu.net/dept/environment/

Advanced Diploma in Energy
Vidya Prasarak Mandals Polytechnic
http://www.vpmthane.org/polywebnew/courses.html

BSc in Environmental Science
University of Calicut
http://www.universityofcalicut.info/

PhD in Environmental Science
Punjab University
http://puchd.ac.in/

MSc in Environmental Science
Bharathiar University
http://www.b-u.ac.in/

MA in Environmental Economics (Distance Learning Course)
Annamalai University
http://www.annamalaiuniversity.ac.in/

PhD in Environmental Bio-Technology & Solid Waste Management School of Environmental Sciences
Jawaharlal Nehru University
http://www.jnu.ac.in/main.asp?sendval=SchoolOfEnvironmentalSciences

MBA in Energy & Environmental Science
Symbiosis Institute of International Business
http://www.siib.ac.in/programmes.aspx

Send Names & Details About Courses Related With Sustainability To uma@managementnext.com

Events

India-Africa Agri Business Forum (2 Day Event)
Wednesday, February 10, 2016, FICCI, New Delhi
Ms. Manisha Sachdeva, manisha.sachdeva@ficci.com

Managerial Skills & Dynamic Leadership - Two Day Workshop
11-12 Feb. 2016 – Mumbai / 10-11 Mar. 2016 – Chennai / 22-23 Mar. 2016 – Pune / 21-22 Apr. 2016 – Bangalore
Contact : t.pramila@cii.in

H_2O Tech, Conference on Water Management
12th Feb. 2016: Hotel The Residency; Coimbatore, India
http://www.indianhighcommission.com.my/commerce/news.php?nid=70#sthash.R7rV8RX4.dpuf

The GRIHA Summit 2016
18th-20th February 2016, Indian Habitat Center, Lodhi Road, New Delhi
http://www.grihaindia.org/index.php?option=com_events&id=114

TIECON Chandigarh
Friday, 19 Feb. 2016, Hotel The Lalit, IT Park, Chandigarh
Contact: harchitvan@tiechandigarh.org\

MODEL GST ACT 2016 "Analysis & Key Sections" - Training Programme
19th February – Chennai / 26th February – Mumbai
Contact - t.pramila@cii.in

The Uttar Pradesh Travel Mart
Sunday, February 21, 2016, Agra
Contact: Samanda S. Syiem, samanda.syiem@ficci.com

TURF 2015-16, 7th Global Sports Summit (2 Day Event)
FICCI, New Delhi
Contact: Amit Mantri, amit.mantri@ficci.com

National Conference on Export Controls (2 Day Event)
Monday, February 22 2016, Bengaluru
Contact: Malvika Kareer, malvika.kareer@ficci.com

5th Annual International Conference on Sustainable Energy & Environmental Sciences
February 22-23, 2016, Hotel Fort Canning, Singapore
http://www.nature.com/natureevents/science/events/37349-5th_Annual_International_Conference_on_Sustainable_Energy_and_Environmental_Sciences_SEES_2016

Training Programme on Energy Management and Conservation in Cement Industry
25 - 26 February 2016, Vijayawada

CII - CSR Online Educational Series Exclusively for NGOs
5 - 26 February 2016, Every Friday from 15:00-17:00 Hrs
http://cii.in/PrjOnlineRegistration.aspx?Event_ID=E000028587

Environmental Management of Renewable Energy Projects
March 3 - 7, New Delhi
Contact: Sridhar Sekar (sridhar@cseindia.org)

AgriCon 2016 - Conference on Precision Agriculture Technologies
04th March 2016: Hotel Hilton, Chennai, INDIA
https://allevents.in/chennai/agricon-2016-conference-on-precision-agriculture-technologies/1686590798219317#

8th Edition of Conference on Automotive R&D Trends - Theme: "Strategizing R&D: Meeting the Regulatory Challenges"
7th March 2016: 0900 Hrs; Hotel Hilton, Chennai
http://cii.in/EventsDetails.aspx?enc=eo18/j+aJMWXCXiMZZAdozRIsBTGOh4NR2nb4g2EcpFiDjcMfckJOO6W0K8d+Pr3/JSSTFUrv0/yC3LRvEgnWBu8+ash4QmsPJpQ+VAYpR0TBVoKqWfXB2GV6mUjNSr2iOB9/D1Kfqnpf1Lqi7PwQQpE+f9AiLL2PUDUr4wNxr8ImQW4WIUEf9nniu+d9G6q+w9pSVY/+7Q5rZ9iEUX54Q==

India Smart Grid Week (ISGW 2016), an International Conference and Exhibition on Smart Grids and Smart Cities
15th - 19th March 2016, Manekshaw Centre, Dhaula Kuan, New Delhi
http://www.indiasmartgrid.org/isgw.php

4th Township Development
16-17 March 2016, GoodWood Park, Singapore
Contact: Karen Leong - karenl@trueventus.com

5th Annual Industrial Estate and Business Parks
16-17 March 2016, GoodWood Park, Singapore
Contact: Karen Leong - karenl@trueventus.com

India m2m2iot Forum 2016
25 April 2016
www.m2m2iotforum.com

India Smart Cities Forum 2016
26 April 2016
www.indiasmartcitiesforum.com

India Smart Villages Forum 2016
27 April 2016
www.smartvillagesforum.com

Discuss Agile Conference Bangalore 2016
April 15, 2016 - April 16, 2016
Octave Hotel, Bangalore

The Middle East Building Automation Summit 2016
26- 27 April, 2016, Dubai, UAE
http://www.infoxg.com/events/buildingautomation2016

Send Your Events Plan To - uma@managementnext.com